```
838 6546 [8.81702001e-06] 0 0
838 6547 [1.21434371e-05] 0 0
838 6548 [1.59540183e-05] 0 0
838 6549 [1.8700811e-05] 0 0
838 6550 [1.96853685e-05] 0 0
838 6551 [1.19892052e-05] 0 0
838 6552 [1.9086766e-06] 0 0
838 6553 [1.29528778e-05] 0 0
838 6554 [1.55896066e-06] 0 0
838 6555 [9.16939777e-06] 0 0
838 6556 [1.41355637e-06] 0 0
838 6557 [8.39621317e-06] 0 0
838 6558 [1.26097692e-06] 0 0
838 6559 [7.11972289e-06] 0 0
838 6560 [1.20793444e-06] 0 0
838 6561 [7.63085567e-06] 0 0
838 6562 [9.9178126e-07] 0 0
838 0
839 6563 [3.82584014e-06] 0 0
839 6564 [4.73328071e-06] 0 0
839 6565 [6.06514272e-06] 0 0
839 6566 [7.80940421e-06] 0 0
839 6567 [9.3586096e-06] 0 0
839 6568 [5.34604471e-06] 0 0
839 6569 [2.78219111e-06] 0 0
839 6570 [8.45712635e-06] 0 0
839 6571 [1.63848673e-06] 0 0
839 6572 [1.36772149e-05] 0 0
839 6573 [1.47746301e-06] 0 0
839 6574 [1.53445065e-05] 0 0
839 6575 [9.13904766e-07] 0 0
839 0
840 6576 [5.17558134e-06] 0 0
840 6577 [1.81915976e-06] 0 0
840 6578 [2.42944633e-05] 0 0
840 6579 [2.55427589e-06] 0 0
840 6580 [4.71374235e-06] 0 0
840 6581 [1.31851896e-06] 0 0
840 6582 [2.21669096e-05] 0 0
840 6583 [5.39535579e-07] 0 0
840 0
841 6584 [1.55617327e-06] 0 0
841 6585 [3.20502575e-05] 0 0
841 6586 [1.20145812e-06] 0 0
841 6587 [2.80862921e-05] 0 0
841 6588 [5.42267146e-07] 0 0
841 0
842 6589 [2.40281805e-06] 0 0
842 6590 [3.04916503e-06] 0 0
842 6591 [1.71217123e-06] 0 0
842 6592 [8.84800564e-06] 0 0
842 6593 [5.06772301e-07] 0 0
842 0
843 6594 [1.15139109e-06] 0 0
843 6595 [2.76864025e-05] 0 0
```

```
843 6596 [3.96888622e-07] 0 0
843 0
844 6597 [8.32425022e-07] 0 0
844 0
845 6598 [6.1046371e-06] 0 0
845 6599 [5.80414849e-07] 0 0
845 0
846 6600 [1.75802858e-06] 0 0
846 6601 [4.96846635e-06] 0 0
846 6602 [6.63755958e-07] 0 0
846 0
847 6603 [2.91137504e-06] 0 0
847 6604 [1.30325985e-06] 0 0
847 6605 [1.74997319e-05] 0 0
847 6606 [3.20431084e-07] 0 0
847 0
848 6607 [5.35091794e-07] 0 0
848 0
849 6608 [1.42791649e-06] 0 0
849 6609 [8.55709459e-06] 0 0
849 6610 [3.96792955e-07] 0 0
849 0
850 6611 [7.75638191e-07] 0 0
850 0
851 6612 [6.74767814e-06] 0 0
851 6613 [4.45134446e-07] 0 0
851 0
852 6614 [1.02626637e-06] 0 0
852 6615 [3.15880913e-05] 0 0
852 6616 [8.39387284e-07] 0 0
852 0
853 6617 [3.05683768e-05] 0 0
853 6618 [6.91483369e-07] 0 0
853 0
854 6619 [1.8244699e-05] 0 0
854 6620 [2.4561601e-07] 0 0
854 0
855 6621 [3.91916266e-07] 0 0
855 0
856 6622 [8.778304e-07] 0 0
856 0
857 6623 [2.87237643e-05] 0 0
857 6624 [6.06430733e-07] 0 0
857 0
858 6625 [1.11144541e-05] 0 0
858 6626 [3.05151883e-07] 0 0
858 0
859 6627 [5.86768676e-07] 0 0
859 0
860 6628 [2.84639686e-06] 0 0
860 6629 [1.02112355e-06] 0 0
860 6630 [6.90188833e-06] 0 0
860 6631 [2.8973915e-07] 0 0
860 0
861 6632 [5.82119417e-07] 0 0
```

```
861 0
862 6633 [4.65082669e-06] 0 0
862 6634 [3.93153615e-07] 0 0
862 0
863 6635 [1.18949753e-06] 0 0
863 6636 [3.41544861e-06] 0 0
863 6637 [4.37472037e-07] 0 0
863 0
864 6638 [1.83519462e-06] 0 0
864 6639 [9.94884162e-07] 0 0
864 0
865 6640 [6.5472959e-06] 0 0
865 6641 [2.67412778e-07] 0 0
866 6642 [4.87139732e-07] 0 0
866 0
867 6643 [2.69165074e-06] 0 0
867 6644 [5.27166102e-07] 0 0
867 0
868 6645 [4.52642443e-06] 0 0
868 6646 [3.23222039e-07] 0 0
868 0
869 6647 [7.7416839e-07] 0 0
869 0
870 6648 [2.36918042e-05] 0 0
870 6649 [2.27496295e-07] 0 0
870 0
871 6650 [5.27613428e-07] 0 0
871 0
872 6651 [5.50969826e-06] 0 0
872 6652 [2.56347133e-07] 0 0
872 0
873 6653 [4.89191453e-07] 0 0
873 0
874 6654 [3.7987198e-06] 0 0
874 6655 [3.21462282e-07] 0 0
874 0
875 6656 [8.68351831e-07] 0 0
875 0
876 6657 [7.25844081e-06] 0 0
876 6658 [2.16199562e-07] 0 0
876 0
877 6659 [3.56744696e-07] 0 0
877 0
878 6660 [1.12387081e-06] 0 0
878 6661 [2.08416158e-06] 0 0
878 6662 [5.54032457e-07] 0 0
878 0
879 6663 [1.13847599e-05] 0 0
879 6664 [1.80466643e-07] 0 0
879 0
880 6665 [2.72464644e-07] 0 0
880 0
881 6666 [5.47007955e-07] 0 0
881 0
```

```
882 6667 [1.02247471e-05] 0 0
882 6668 [1.80759553e-07] 0 0
882 0
883 6669 [2.74239184e-07] 0 0
883 0
884 6670 [5.72381094e-07] 0 0
884 0
885 6671 [1.56470129e-05] 0 0
885 6672 [1.64356672e-07] 0 0
885 0
886 6673 [2.57670738e-07] 0 0
886 0
887 6674 [5.06588094e-07] 0 0
887 0
888 6675 [7.59090624e-06] 0 0
888 6676 [1.90778215e-07] 0 0
888 0
889 6677 [3.04894752e-07] 0 0
889 0
890 6678 [8.09557514e-07] 0 0
890 0
891 6679 [5.54484964e-06] 0 0
891 6680 [2.10996591e-07] 0 0
891 0
892 6681 [3.74285785e-07] 0 0
892 0
893 6682 [1.73769818e-06] 0 0
893 6683 [5.84281758e-07] 0 0
893 0
894 6684 [2.25375385e-05] 0 0
894 6685 [2.62139143e-07] 0 0
894 0
895 6686 [1.05085755e-06] 0 0
895 6687 [1.78702209e-06] 0 0
895 6688 [5.35715658e-07] 0 0
895 0
896 6689 [1.50141022e-05] 0 0
896 6690 [1.5998674e-07] 0 0
896 0
897 6691 [2.57368676e-07] 0 0
897 0
898 6692 [5.27465843e-07] 0 0
898 0
899 6693 [1.08215285e-05] 0 0
899 6694 [1.65812882e-07] 0 0
899 0
900 6695 [2.55772856e-07] 0 0
900 0
901 6696 [5.22407028e-07] 0 0
901 0
902 6697 [9.93643888e-06] 0 0
902 6698 [1.75076064e-07] 0 0
902 0
903 6699 [2.80221806e-07] 0 0
903 0
```

```
904 6700 [6.48754945e-07] 0 0
904 0
905 6701 [9.74564893e-06] 0 0
905 6702 [2.29780665e-07] 0 0
905 0
906 6703 [4.48710918e-07] 0 0
906 0
907 6704 [1.78824447e-06] 0 0
907 6705 [1.4746075e-06] 0 0
907 6706 [7.91605126e-07] 0 0
907 0
908 6707 [3.70480679e-06] 0 0
908 6708 [2.38998846e-07] 0 0
909 6709 [5.38242029e-07] 0 0
909 0
910 6710 [1.57974479e-05] 0 0
910 6711 [1.52511917e-07] 0 0
910 0
911 6712 [2.64311233e-07] 0 0
911 0
912 6713 [6.2553297e-07] 0 0
912 0
913 6714 [9.709247e-06] 0 0
913 6715 [1.80182571e-07] 0 0
913 0
914 6716 [3.11719531e-07] 0 0
914 0
915 6717 [8.75110961e-07] 0 0
915 0
916 6718 [2.81773915e-06] 0 0
916 6719 [2.74171083e-07] 0 0
916 0
917 6720 [8.51378582e-07] 0 0
917 0
918 6721 [2.19007551e-06] 0 0
918 6722 [3.31302725e-07] 0 0
918 0
919 6723 [1.71156142e-06] 0 0
919 6724 [4.40483587e-07] 0 0
919 0
920 6725 [7.77252711e-06] 0 0
920 6726 [1.5231223e-07] 0 0
920 0
921 6727 [2.3460215e-07] 0 0
921 0
922 6728 [5.10117518e-07] 0 0
922 0
923 6729 [1.62443924e-05] 0 0
923 6730 [1.38937782e-07] 0 0
923 0
924 6731 [2.47505716e-07] 0 0
924 0
925 6732 [6.06469003e-07] 0 0
925 0
```

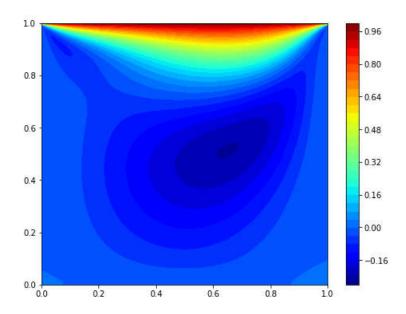
```
926 6733 [8.78067397e-06] 0 0
926 6734 [1.43744575e-07] 0 0
926 0
927 6735 [2.21657053e-07] 0 0
927 0
928 6736 [4.57591567e-07] 0 0
928 0
929 6737 [8.11930991e-06] 0 0
929 6738 [1.83168087e-07] 0 0
929 0
930 6739 [3.33001611e-07] 0 0
930 0
931 6740 [1.12277174e-06] 0 0
931 6741 [1.47463802e-06] 0 0
931 6742 [4.68647667e-07] 0 0
931 0
932 6743 [1.49843896e-05] 0 0
932 6744 [1.31682213e-07] 0 0
932 0
933 6745 [2.2734142e-07] 0 0
933 0
934 6746 [5.10942388e-07] 0 0
934 0
935 6747 [1.16846944e-05] 0 0
935 6748 [1.84865026e-07] 0 0
935 0
936 6749 [3.60414214e-07] 0 0
936 0
937 6750 [1.1723402e-06] 0 0
937 6751 [2.25371843e-06] 0 0
937 6752 [2.79797237e-07] 0 0
937 0
938 6753 [1.20027732e-06] 0 0
938 6754 [6.22972607e-07] 0 0
938 0
939 6755 [4.44996302e-06] 0 0
939 6756 [1.62939053e-07] 0 0
939 0
940 6757 [2.84639253e-07] 0 0
940 0
941 6758 [1.17387688e-06] 0 0
941 6759 [5.95436544e-07] 0 0
941 0
942 6760 [5.23053676e-06] 0 0
942 6761 [1.48164872e-07] 0 0
942 0
943 6762 [2.41097003e-07] 0 0
943 0
944 6763 [6.89335366e-07] 0 0
944 0
945 6764 [2.53113084e-06] 0 0
945 6765 [2.22332822e-07] 0 0
945 0
946 6766 [6.14952225e-07] 0 0
946 0
```

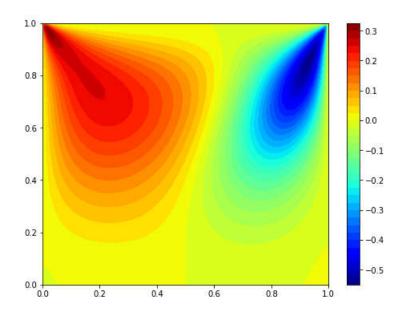
```
947 6767 [4.1283324e-06] 0 0
947 6768 [1.60100901e-07] 0 0
947 0
948 6769 [2.83958471e-07] 0 0
948 0
949 6770 [1.29134396e-06] 0 0
949 6771 [4.60698594e-07] 0 0
949 0
950 6772 [1.60731133e-05] 0 0
950 6773 [1.18680927e-07] 0 0
950 0
951 6774 [2.21335484e-07] 0 0
951 0
952 6775 [5.83405473e-07] 0 0
952 0
953 6776 [4.35246953e-06] 0 0
953 6777 [1.47441217e-07] 0 0
953 0
954 6778 [2.50099628e-07] 0 0
954 0
955 6779 [8.89757668e-07] 0 0
955 0
956 6780 [8.83762502e-07] 0 0
956 0
957 6781 [8.86214642e-07] 0 0
957 0
958 6782 [8.68308157e-07] 0 0
958 0
959 6783 [9.00517759e-07] 0 0
959 0
960 6784 [8.13419469e-07] 0 0
960 0
961 6785 [1.03648467e-06] 0 0
961 6786 [5.68678092e-07] 0 0
961 0
962 6787 [3.66524561e-06] 0 0
962 6788 [1.50631665e-07] 0 0
962 0
963 6789 [2.71057129e-07] 0 0
963 0
964 6790 [1.3709513e-06] 0 0
964 6791 [3.49543355e-07] 0 0
964 0
965 6792 [6.25384988e-06] 0 0
965 6793 [1.21103896e-07] 0 0
965 0
966 6794 [1.82699837e-07] 0 0
966 0
967 6795 [3.76927041e-07] 0 0
967 0
968 6796 [9.02667779e-06] 0 0
968 6797 [1.09729302e-07] 0 0
968 0
969 6798 [1.62074659e-07] 0 0
969 0
```

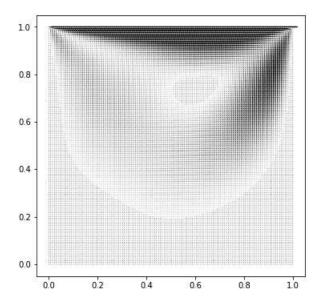
```
970 6799 [2.82244495e-07] 0 0
970 0
971 6800 [1.63744701e-06] 0 0
971 6801 [2.79868715e-07] 0 0
971 0
972 6802 [1.78231691e-06] 0 0
972 6803 [2.54889487e-07] 0 0
972 0
973 6804 [1.20485245e-06] 0 0
973 6805 [4.1599984e-07] 0 0
973 0
974 6806 [1.5770601e-05] 0 0
974 6807 [1.10035314e-07] 0 0
975 6808 [2.09140822e-07] 0 0
975 0
976 6809 [5.68235031e-07] 0 0
976 0
977 6810 [3.23473306e-06] 0 0
977 6811 [1.54364966e-07] 0 0
977 0
978 6812 [2.94822609e-07] 0 0
978 0
979 6813 [2.24889919e-06] 0 0
979 6814 [1.97125847e-07] 0 0
979 0
980 6815 [5.42326664e-07] 0 0
980 0
981 6816 [3.8871981e-06] 0 0
981 6817 [1.38021539e-07] 0 0
981 0
982 6818 [2.36509249e-07] 0 0
982 0
983 6819 [8.95279701e-07] 0 0
983 0
984 6820 [6.72486072e-07] 0 0
984 0
985 6821 [1.44130172e-06] 0 0
985 6822 [2.94243293e-07] 0 0
985 0
986 6823 [2.75975536e-06] 0 0
986 6824 [1.64480023e-07] 0 0
986 0
987 6825 [3.49231927e-07] 0 0
987 0
988 6826 [7.16433405e-06] 0 0
988 6827 [1.08886871e-07] 0 0
988 0
989 6828 [1.60750276e-07] 0 0
989 0
990 6829 [2.95309585e-07] 0 0
990 0
991 6830 [2.48177355e-06] 0 0
991 6831 [1.76407379e-07] 0 0
991 0
```

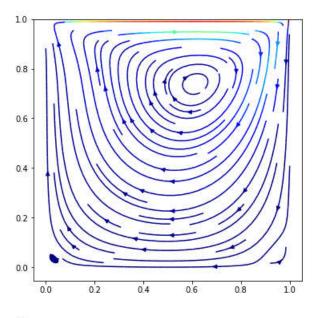
```
992 6832 [4.16153127e-07] 0 0
992 0
993 6833 [1.48132928e-05] 0 0
993 6834 [1.01466503e-07] 0 0
993 0
994 6835 [1.82910493e-07] 0 0
994 0
995 6836 [4.21941954e-07] 0 0
995 0
996 6837 [1.33108102e-05] 0 0
996 6838 [9.57712511e-08] 0 0
996 0
997 6839 [1.57637188e-07] 0 0
997 0
998 6840 [2.97368033e-07] 0 0
998 0
999 6841 [3.08993438e-06] 0 0
999 6842 [1.44638703e-07] 0 0
999 0
```

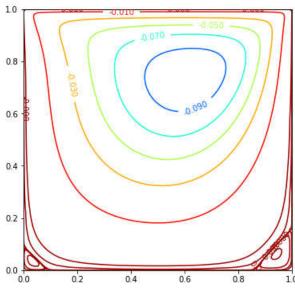
Average Nusselt on top plane: -4.411142904192292

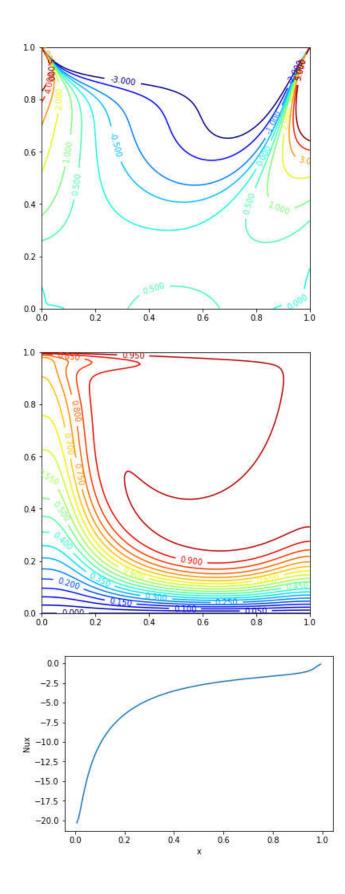


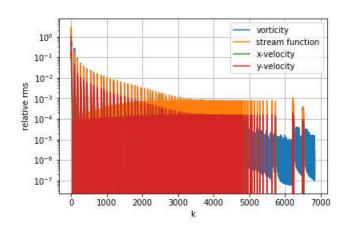


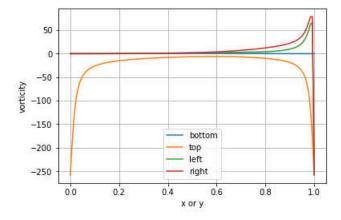


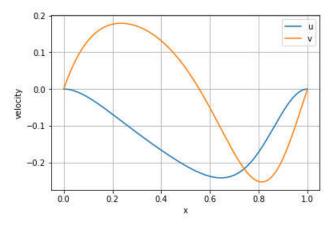


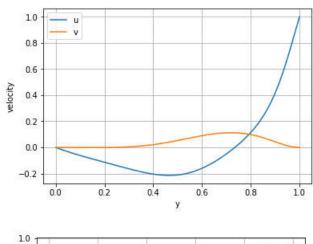


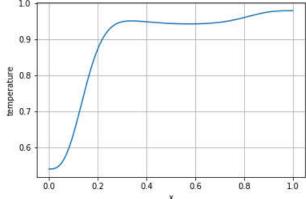


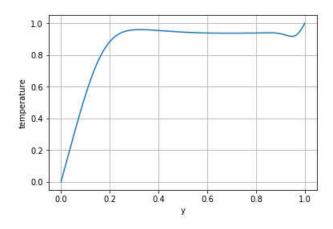




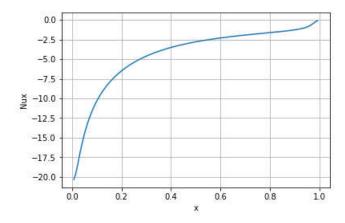








```
In [71]: Nux=-(TEMP[jm,1:im]-TEMP[jm-1,1:im])/dy
    ...: Nuavg=sum(Nux)/(im-1)
    ...: print('Average Nusselt on top plane:',Nuavg)
    ...: plt.figure(7)
    ...: plt.plot(x[1:im],Nux)
    ...: plt.xlabel('x'); plt.ylabel('Nux'); plt.grid(True)
Average Nusselt on top plane: -4.411142904192292
```



In [**72**]: